U.S. Army Corps of Engineers, Kansas City District

Appendix F.

Mitigation Plan

City of Topeka, Kansas
Flood Risk Management Study
Draft Environmental Assessment

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Mitigation Plan
City of Topeka
Flood Risk Management Study
Topeka, Kansas

April 2008

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Kansas City District
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MITIGATION PLAN
TOPEKA, KANSAS, LEVEE FEASIBILITY STUDY

1.0 SITE DESCRIPTION

The Topeka flood risk management project will impact about seven and one-half acres of a 25-acre woodland due to installation of an under seepage berm at the South Topeka unit. This woodland is part of the floodplain forest that extends along the Kansas River in the Topeka, Kansas section of Shawnee County. The riparian floodplain forest that remains along the Kansas River is considered the highest quality habitat in the Topeka area. Specifically, this woodland is located near the South Topeka levee unit, beginning at river miles 86.0 to 85.4. The south border of the woodland is the border for developed urban areas including a railroad and major U.S. Interstate Highway (see Figure 4).

The quality of the woodland is considered moderate based on the habitat quality assessment model, and it is assumed that the woodland is about 30 years old. Woody species found in this area are typical of those found within the Kansas River riparian floodplain which includes species such as the eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), black walnut (*Juglans nigra*), sandbar willow, (*Salix exigu*), box elder (*Acer negundo*), Siberian elm (*Ulmus pumila*), sycamore (*Platanus occidentalis*), and white mulberry (*Morus alba*). The herbaceous layer contains species such as Nettle (*Urtica*), pokeweed (*Phytolacca*), white snakeroot (*Polygala sp*), Japanese honeysuckle (*Lonicera japonica),* and common blue violet (*viola septentrionalis*).

2.0 COMPENSATION AND AVOIDANCE

To offset the loss of this habitat, a tree planting program covering 15 acres is recommended based on the results of the habitat model. The assumption that the proposed impacted area would take up to 30 years to reestablish native vegetation equal to the current value was considered in the model. Further, it was assumed that many of the planted trees will not survive to maturity due to weather, predation, disease, etc. The restored site would provide wildlife habitat suitable to support those species found within the existing site.

In accordance with the Migratory Bird Treaty Act, additional mitigation measures would include the avoidance of construction activities in woodland areas during the migratory bird nesting season from April 1 to July 15. These recommendations coincide with the U.S. Fish and Wildlife Coordination Act Report.

3.0 JUSTIFICATION

Quantitative- Habitat Quality Assessment Model

A community habitat suitability model for bottomland hardwoods (LDNR, 1994) was used to quantify net gains and losses of ecological value associated with future with project and future without project conditions. This model is a modification of the U.S. Fish and Wildlife Service's habitat evaluation procedure (HEP). Target years used for the project ranged from baseline, 0 to 50 years. A total of seven variables were used as indicators to assess habitat value (species association, maturity, understory and midstory percentages, hydrology, forest size, surrounding

land use, and disturbance). To assess the suitability of the habitat for providing resting, foraging, and breeding for wildlife species, habitat suitability indices (HSI) were calculated for each target year of the project. The HSI is presented as a value between 0 and 1.0, and is a measure of habitat quality. The HSI value is multiplied by the habitat quantity to produce a habitat value measure termed Habitat Units (HU). The habitat units were calculated across the life of the project and the average annual habitat units (AAHUs) were compared under future with project and future with project conditions (see Appendix G).

Future without Project (FWOP)

Without the project, the woodland is expected to continue to grow and reach full maturity by age 50. The total AAHU for Future without the project is 13.92. At the end of 50 years, FWOP would yield HSI value of 0.60, which is considered slightly above a moderate value. A HSI value of 0.60 is generally less than expected for mature woodland, but the model used to generate this value is influenced by the proximity of the site to a major disturbance such as an interstate highway, as well as the land use of the surrounding area which is primarily agriculture, industrial and residential development.

Future with Project Conditions (FWPC)

Future project conditions with and without mitigation were analyzed separately. Based on the HSI indices of the model, removal of about 8 acres would reduce the quality of the woodland from moderate (0.41) to low (0.29) at project year one. In addition, this would reduce the amount of resources available for supporting wildlife and promote opportunities for invasive species establishment within the impacted area. For the model analysis, it was assumed that the remaining 17 acres of disturbed woodland site would continue to develop towards maturity. The output of the model projects by project age 50, the disturbed site without mitigation would yield a HSI value of 0.46. This value is relatively low when compared to the "future project conditions with-mitigation measures" where a HSI value of 0.80 is projected. The average annual habitat units for the "with-mitigation measures" are 7.49, and without-mitigation measures yield an average of 6.62 habitat units. When the AAHUs of mitigation-measures are added to those of the without-mitigation measures, a total of 14.11 AAHUs are gained for future with project conditions (see Appendix G).

Conclusion

The results of the habitat model indicate that future with project AAHUs minus future without project AAHUs would result in a net change of zero. Therefore, a total of 15 acres of mitigation would compensate for the loss of 7.5 acres of habitat.

QualitativeAssessment

The woodland site at the South Topeka unit provides important habitat for various wildlife species and is part of the floodplain forest that extends along the Kansas River. The Kansas River riparian corridor provides crucial habitat for many species which are of biological, cultural, and/or commercial importance. Thousands of waterfowl use the Kansas River channel and floodplain during migration and wintering. Several species of commercially valuable furbearers occur in the riparian habitats, including muskrat, mink, beaver, raccoon, and both red and grey fox. The riparian forests and meadows provide migration and nesting habitat for many species of birds, including many declining neotropical migratory songbirds (USFWS BiOp,

2000). The Kansas Ornithological Society has listed 320 bird species found in Shawnee County. At least 80 of those species have been identified as nesting within Shawnee County. Removal of this woodland area may cause further decline in the numbers of species that depend on these areas, as the native vegetation may take years to reestablish (USFWS, 2007). Also, the project area offers potential perching and nesting habitat for endangered species such as the bald eagle and Indiana bat.

Although the Topeka Levee system separates this area from the river, this woodland provides an important corridor to facilitate the movement of flora and fauna between other patches of natural habitat. Specifically, it allows plants to propagate from one patch to another, and wildlife species to move in response to environmental changes or escape from predators.

Moreover, the availability of riparian woodland areas in the project area is scarce and declining. There is little refuge habitat in close proximity to the project area and available habitat is presumably at carrying capacity, which further reduces the likelihood of wildlife surviving the displacement and intensifies the competition for the limited habitat available (USFWS, 2007). S.H. Long wrote that the Kansas River valley in 1905 contained forests of cottonwood, sycamore, etc, interspersed with meadows about one-half mile wide" (Thwaites 1905b). Further downstream near present-day Lawrence (KS), Douglas County, Fitch and McGregory (1956) reported from early accounts in the 1950's that the floodplain contained "rich mesophytic forest of predominantly oak-hickory type." Continuing bank erosion, coupled with floodplain encroachment, has reduced the perennial riparian vegetation native to the Kansas River channel. Though accurate data are not available for pre- and post-construction periods, it is likely that at present there is very little riparian forest which meets naturalist Thomas Say's (Thwaites 1905b) description. Also, bank stabilization projects, some of which may be detrimental to aquatic habitats and channel hydraulics, could be reduced or eliminated if suitable riparian vegetation were maintained (Sanders et al. 1993).

5.0 MITIGATION SITE SELECTION

The mitigation plantings would be at the impacted site and within at the North Topeka unit of the project area. The North Topeka mitigation site is located between river miles 87.8 to 87.5, and upstream of the impacted site at South Topeka (see Figure 13). It is owned by the city of Topeka and is part of the existing riparian forest corridor along the Kansas River. Selected because it contains similar soil types and plant species to those of the impacted site, it offers the greatest vegetative diversity and degree of interspersion with other habitat types, which are important to many wildlife species.

The area between the levees, which includes the Kansas River, contains much of the remaining available wildlife habitat. The riparian forest that remains along the Kansas River is the highest quality habitat in the Topeka area. The mitigation site provides closer access to the river than the impacted site, which is important for waterfowl and shorebird resting, and feeding and staging areas during migration. Also, this site contains two disturbed areas, one is currently bare land and the other is planted with row crops. If these areas are planted with native species, they would provide beneficial habitat for area wildlife. This is especially important in an area where much of the riparian forest has been developed. Within the impacted site, plantings would consist of native species as well as mast-producing tree species to provide additional year-round sources of food for wildlife.

The proposed North Topeka mitigation site is dominated by cottonwood and box elder (*Acer ndegundo*) trees and Siberian elm shrubs. The agricultural field located within this site contains soy beans, occasional dock (*Rumex* sp.), giant foxtail grass (*Setaria faberii*), and annual ragweed (*Ambrosia artemisiifolia*). The western border of the field is dominated by Johnson grass (*Sorghum halepense*), goosefoot (*Chenopodium* sp.), annual sunflower (*Helianthus annuus*) and goldenrod (*Solidago* sp.), with some occasional Siberian elm (*Ulmus pumila*) and cottonwood (*Populus deltoides*) shrubs.

6.0 PLANT LIST

The mitigation plan will include plantings of various species of native trees, shrubs, forbs and grasses such as those listed below. A planting plan will be developed and made available during the Design Phase of the project.

Acer saccharinum/Sliver Maple
Carya illinuensis/Pecan
*Carya laciniosa/*Shellbark Hickory
*Crataegus phaenopyrum/*Hawthorn
*Diospyros virginiana/*Persimmon
Juglans nigra/Black Walnut
Quercus alba/ White Oak
Quercus macrocarpa/Bur Oak
Prunus Americana/American Plum
Populus deltoids/ Eastern cottonwood

Shrubs
Ribes missouriense/Gooseberry
Cornus drummondii/Roughleaf Dogwood
*Cornus foemina/*Gray dogwood
*Amelanchier arborea/*Common serviceberry
*Prunus virginiana/*Common Chokeberry
*Sambucus Canadensis/*Elderberry

Forbs
Asclepias tuberosa /Butterfly weed
Aster novae-angliae/ New England Aster
Cassia fasciculate/ Patridge Pea
Coreopsis lanceloata/ Sand Coreopsis
Echinacea purpurea / Broad-Leaved Purple Coneflower
Heliopsis helianthoides / False Sunflower
Liatris aspera/ Rouge Blazing Star
Lupinus perennis/ Wild Lupine
Ratibida pinnata/ Yellow Coneflower
Rudbeckia hirta / Black-Eyed Susan

Temporary Cover and Grasses
Avena sativa/ Seed Oats

Lolium multiflorum/ Annual Rye
Andropogon gerardii/ Big blue stem
Andropogon scoparius/ Little blue stem
Bouteloua curtipendula/ Side Oats Grama
Elymus Canadensis/Canada wild rye
Panicum virgatum/Switch grass
Sorghastrum nutans/ Indian grass

7.0 WORK PLAN

Within the impacted site, about five acres of trees and shrubs would be planted landward of the levee, behind the constructed under seepage berm. All trees and shrubs would be container grown and of the root-production method (RPM). The 3-gallon container grown trees would be at least 2-3 feet tall when planted. Trees would be spaced 20 x 20 feet apart within and between rows to allow trees to canopy in approximately 20 years (NRCS 1999). Larger shrubs such as dogwood and chokecherry would be spaced at least 10 x 10 feet apart. Smaller shrubs such as beautyberry would be spaced at least 4-6 feet apart (NRCS, 1999 and Tylka, 2002). The entire planting area would equal 2,200 linear feet x 100-foot wide.

At the North Topeka site, within the bare area, about five and on-half acres of trees would be planted near the river, followed by one-half acre of shrubs. Trees would be spaced 20 x 20 feet apart and the shrubs would be spaced 10 x 10 feet apart. Within the adjacent crop area, approximately four acres of native grasses and forbs would be planted. The total amount of mitigation plantings at both sites would be 15.0 acres. In addition, the plantings would include native woody species, forbs and grasses that are suitable for the area and that have multiple values suited for timber, cover, nuts, fruit, browse, nesting and aesthetics. A non-competitive, perennial ground cover such as Virginia wild rye (*Elymus virginicus*) or red top panic grass (*Panicum rigidulum*) would be planted within the tree and shrub rows. The method of planting would include hand or machine planting techniques suited to achieving proper depths and placement of planting root stock. Invasive species within the project area would be controlled during site preparation and annual maintenance.

8.0 MONITORING PLAN

Site visits would be made by Corps personnel soon after levee construction, once mitigation plantings are completed, and every year thereafter for five years or until the plants are fully established. Site assessments would include an evaluation of vegetation growth, types of species, hydrology, and photos. This would be done at each visit to help make performance determinations and future recommendations.

9.0 PERFORMANCE STANDARDS

Success of the habitat would be based on the establishment of continuous healthy, flourishing growth of native vegetation. Also, the percentage native species survival would be considered in determining site success. The minimum factor used to determine success would be 85% of the plantings having healthy, flourishing growth at the end of three years. Invasive species would be controlled as they are observed. Best Management Practices (BMPs) would be used to prevent

the inadvertent spread of exotic and invasive species to or from the mitigation areas. This includes insuring that all equipment brought on or from the site would be thoroughly washed to remove dirt, seeds, and plant parts. Any equipment that has been in any body of water within the past 30 days will be thoroughly cleaned with hot water greater than 140 degrees Fahrenheit and dried before being used at this project site.

10.0 SITE PROTECTION

Current access to the proposed mitigation site is limited and hard to reach by the general public, making disturbance of the mitigation sites unlikely. The area is owned by the city of Topeka, which is also the local sponsor of the project. The city will retain ownership of the mitigation site after project construction is completed. There is no public access to the levees at this time; and the Corps will obtain a permanent easement to ensure the protection of these areas. In addition, interpretative signs would be posted around the site highlighting the COE's restoration efforts.

11.0 MAINTENANCE

Trees

To minimize the amount of care needed after planting, extra steps would be taken during the installation. This includes using biodegradable weed barrier mat or organic mulch to limit the growth of weeds; a 24/30 photodegradable plastic tree guard or similar protection device to protect young trees against rodent and deer damage; and a slow-release fertilizer applied around each tree. In addition, a noncompetitive, perennial ground cover would be planted over the entire area. This will help reduce the amount of weeds growing after site preparation. In addition, a watering and care plan will be developed and implemented. Also, it is preferred that the areas be allowed to regenerate naturally from the existing seed bank

Native Grass/Forbs

The newly seeded native grass/forbs would receive the equivalent of one inch of water per week for the first 6 to 8 weeks, either via rainfall or irrigation. Since burning is not practical, native grass/forbs areas would be mowed in late fall annually during the first three years, and every third year thereafter to keep out woody growth. Invasive species would be controlled as soon as they are noticed.

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